BLASTOMYCOSIS OF THE SPINE.

DOUBLE LESION: TWO OPERATIONS: RECOVERY.

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THE following case of blastomycosis of the spinal column, with two separate and entirely distinct foci of infection, is of sufficient rarity and interest to justify this report.

D. S., male, aged 20, of Russian birth, came to America six months before his admission to the Roosevelt Hospital in December, 1906. His previous personal history was negative. Three months before admission he began to complain of pain in the back. He was examined at the out-patient clinic of one of our large hospitals, was told that his trouble was muscular rheumatism, and was given appropriate treatment. The pain was not relieved, and several weeks later, there appeared pain at the epigastrium, which was more or less intermittent at first, and was generally more severe after his mid-day meal. Shortly after this he noticed stiffness of the back, and moderate tenderness between the shoulder blades. Two weeks before admission, his brother called his attention to a swelling over the upper dorsal spine.

On admission to the hospital, his chief complaints were pain and stiffness of the back, severe and almost continuous pain in the upper abdomen, general bodily weakness, loss of appetite and weight.

Examination.—A poorly nourished boy with pale sallow complexion. Heart and lungs normal. Tenderness in left upper quadrant of the abdomen, but no muscular rigidity. Liver and spleen not palpable. On exposing the back, there was found an oval tumor in the midline immediately over the spines of the second, third and fourth dorsal vertebræ. The tumor was covered by apparently normal skin, which was not adherent. There was no heat nor redness. On palpation the tumor was elastic but not frankly fluctuating, was about 8 cm. in diameter, could not be made to disappear on pressure. There was no pulsation. The mass was moderately sensitive. The spines of the second and fourth dorsal vertebræ could be palpated, but that of the third could not be felt. There was absolute rigidity of the upper dorsal spine.

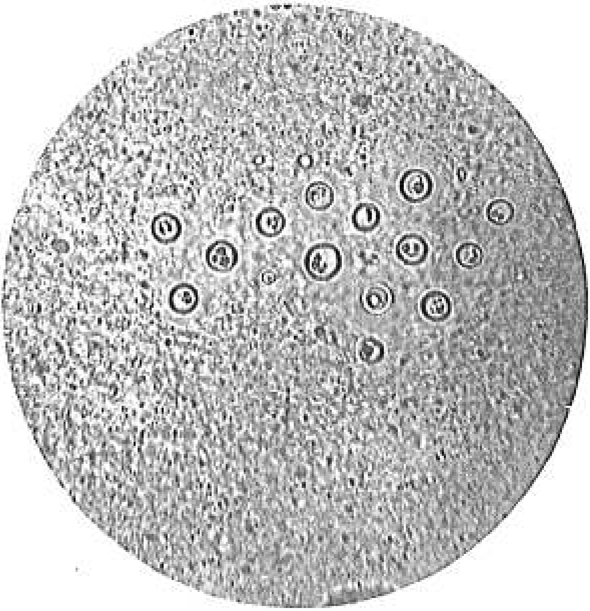
The patient was examined by several members of the hospital staff, and opinions were about equally divided between a diagnosis of soft sarcoma, and a tuberculous osteomyelitis of the arch of the third dorsal vertebræ.

Temperature on admission 99.8°; pulse 90. Urine cloudy, 10.26, faint trace of albumin, no sugar; the sediment consisted of amorphous urates.

Two or three days later an aspirating needle was introduced into the mass and a syringeful of dark colored pus removed. On microscopic examination the fluid was found to consist of pus and blood, and a large number of blastomycetes (Fig. 1).

On December 20, under ether anæsthesia, an elliptical incision was made over the centre of the mass, which included a portion of the skin lying directly over the spinous processes of the second, third and fourth dorsal vertebræ. The skin and subcutaneous areolar tissue were then dissected away from the median line on both sides, until the entire tumor, covered only by the superficial muscles, was exposed. An attempt was then made to dissect the entire abscess-cavity free before opening it. In this we were unsuccessful. On opening the cavity about 100 c.c. of dark colored pus was evacuated. The spinous process of the third dorsal vertebra was entirely necrotic and removed; the corresponding laminæ were eroded and in places necrotic, the diseased areas were scraped away by a sharp bone curette. The walls of the abscess-cavity were thick and covered with large granulations. A portion of the cavity

Fig. 1.



Blastomycetes in fresh pus from abscess.

extended nearly to the left scapula beneath the rhomboid muscles. The entire wall was dissected out, and all diseased bone and infiltrated muscle and fascia removed. After thorough irrigation and the application of a solution of 1-100 formalin, the wound was closed by several layers of buried sutures, and an aseptic dressing applied.

The operation was followed by a slight reaction only, the temperature reaching 101.5° on the second day. First dressing on the third day. Cigarette drain removed and replaced by small gauze wick. Stitches removed on the twelfth day. Primary healing of wound except at drain opening, which continued to secrete a small amount of yellow serum until his discharge, fifteen days after operation. Before his discharge from the hospital a careful examination was made of his entire body, with a view to finding a primary focus or point of entry of the infection. The result of the examination was negative. The sputum, obtained by forced cough, and the stools were examined for blastomycetes, but with negative result.

The patient returned to the hospital for dressing several days later, and the wound was found to be completely healed. The abdominal pain had largely disappeared, but the spine was still rigid.

On February 21 the patient again applied for admission to the hospital, complaining of backache and a painful swelling in the lumbar region. The temperature was normal; pulse 84. Hæmoglobin 95 per cent., leucocytes 21,400, polynuclears 80 per cent., eosinophiles 2 per cent. On examination, there was found a fluctuating tumor just to the left of the midline over the region of the upper three lumbar spines.

Two days later under ether anæsthesia, a curved cutaneous incision was made surrounding the periphery of the tumor, and the flap dissected toward the median line of the back. A large abscess cavity was entered containing about 120 cc. of yellowish pus. Two or three of the spinous processes were found to be involved, and these with the walls of the abscess and surrounding infiltrated muscles were completely removed, leaving a large cavity, which could not be completely obliterated by suturing the neighboring muscles together. The wound, however, was closed as completely as possible and a cigarette drain introduced in the lower angle.

A careful examination of the seat of the previous operation was made, and no evidence of local recurrence discovered. Slight reaction followed the operation. First dressing on the seventh day, when the wound was found to be nearly united.

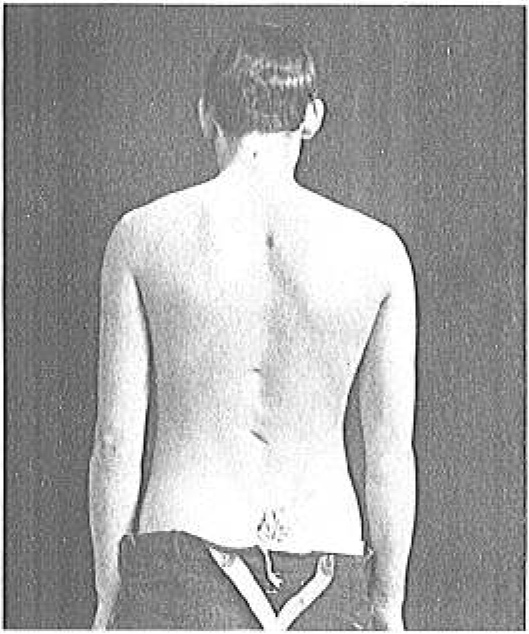
His condition remained satisfactory with normal temperature and pulse until the fourteenth day, when the temperature rose to 104°; pulse 114. On dressing the wound for the third time it was found to be badly infected, probably an accidental contamination at the previous dressing. Drainage was introduced, and daily dressings thereafter with irrigation and packing.

He made a slow convalescence, but was discharged from the hospital on the twenty-sixth day after operation with the wound nearly healed. He returned for dressings at intervals, and in a short time the wound was completely closed. After this he returned at infrequent intervals, each time reporting improvement in general health, and a gradual diminution in the stiffness of the back.

He was last seen and examined in March, 1908, about one year from the date of his last discharge from the hospital. At this time he reported that he was in perfect health, had gained about twenty pounds in weight, and was able to do his regular work as a waiter in a down-town restaurant. The wounds are solidly healed, no induration or tenderness. Mobility of spine nearly normal, a slight rigidity still present in the upper dorsal region, chiefly noticed when he attempts to arch the spine backward.

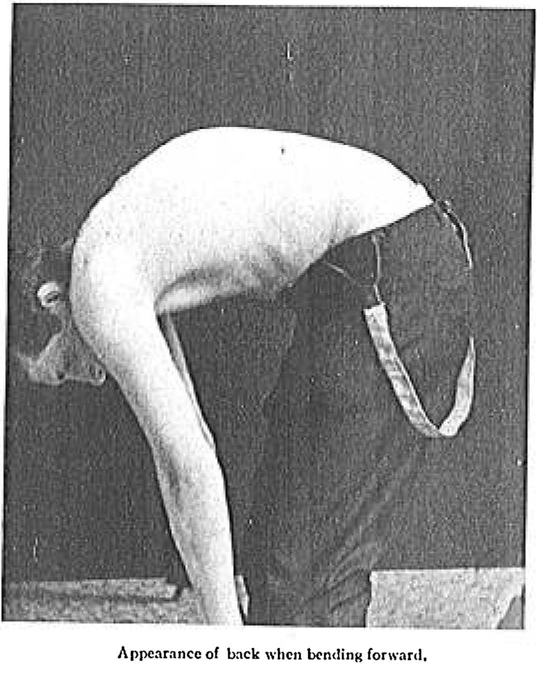
Fig. 2 shows the appearance of the back in the erect position; Fig. 3 when bending forward, and Fig. 4 when bending backward. All of these movements as well as lateral bending of the spine, are executed without pain or discomfort of any kind.

FIG. 2.



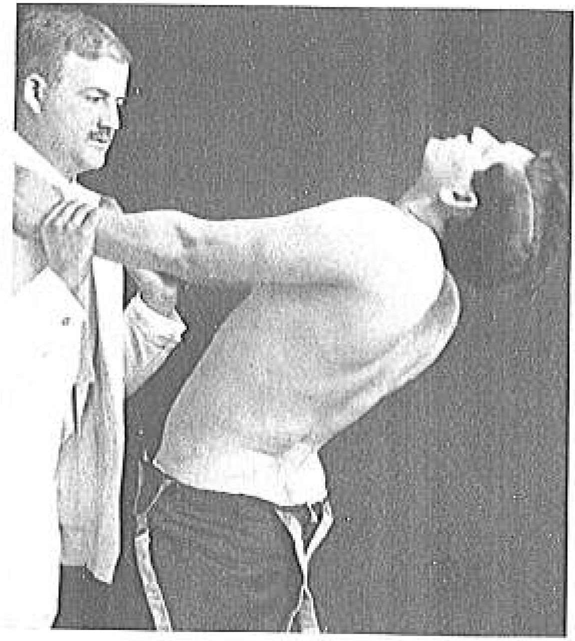
Appearance of back at present time in the erect position.

Fig. 3.



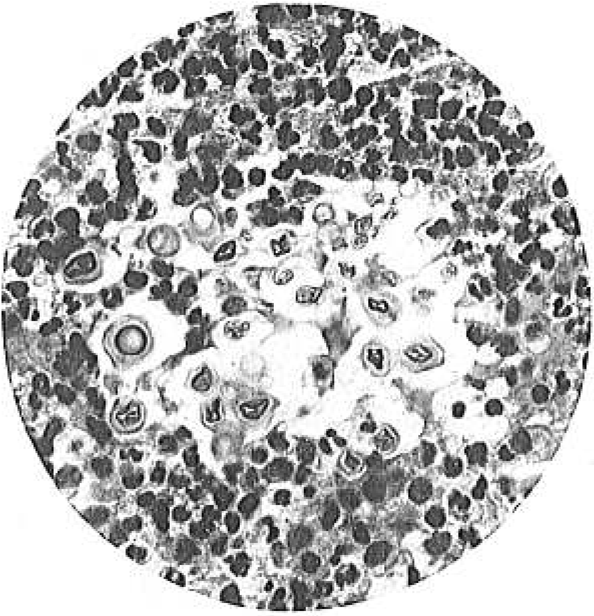
Appearance of back when bending forward.

FIG. 4.



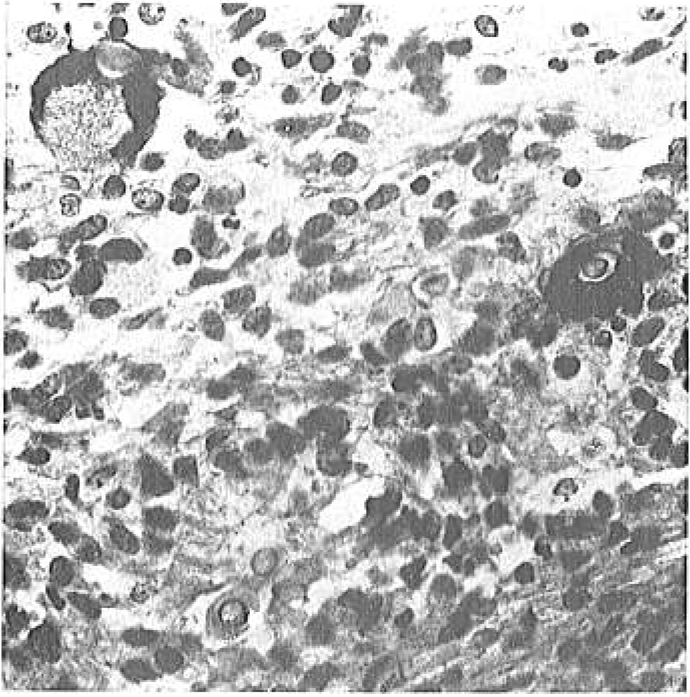
Appearance of back when bending backward.

Fig. 5.



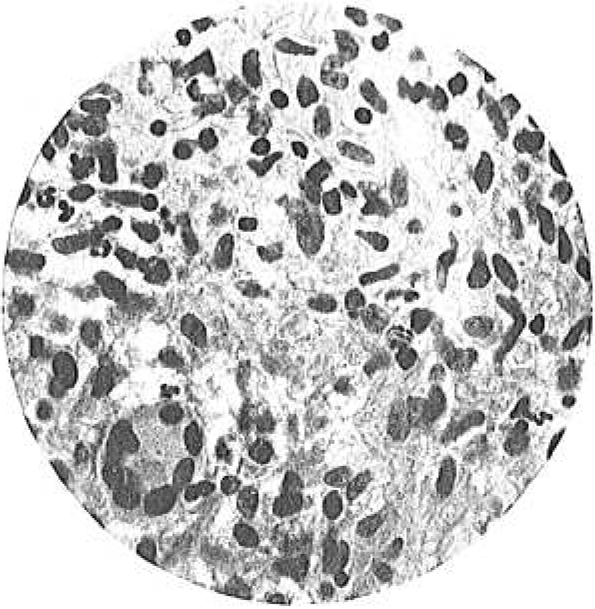
Mass of blastomycetes in granulation tissue. Many of the organisms are shrunken and irregular in form; others are well preserved. The granulation tissue is very loose and œdematous and contains numerous eosinophile and plasma cells. There is as yet no distinct giant cell formation in this portion of the tissue.

FIG. 6.



Granulation tissue containing a moderate number of blastomycetes and two phagocytic giant cells; also numerous plasma and eosinophile cells.

FIG. 7.



Firm granulation tissue with a single giant cell, containing only a remnant of a parasite. From the periphery of the abscess.

Examination of the fresh pus removed from the abscess at the first operation, showed a large number of blastomycetes (Fig. 1). The organisms were doubly contoured; none of them were budding. The central portion of the parasite contained from one to five small, spherical bodies which were highly refractile. These particles were surrounded by a thick cell wall, and outside of this a broad gelatinous capsule. The organisms measured from 10 to 25 micra in diameter. The fluid contained a large number of polynuclear neutrophile and eosinophile cells, showing albuminous and fatty degeneration. On the addition of a small amount of aqueous solution of thionin, the clear peripheral portion of the blastomycetes took on a faint bluish stain, while the central part became deeply colored, especially the small spherical bodies.

The material obtained for pathological examination consisted of fragments of bone from the spinous process and laminæ and the abscess wall.

Microscopical examination of the bone removed showed no blastomycotic organisms in or about the bone substance; there was, however, considerable inflammation with a rarefying osteitis. In the wall of tissue which lined the abscess-cavity there were a very large number of parasites, many of them lying either surrounded by granulation tissue (Fig. 5) or imbedded in giant cells (Fig. 6). Occasionally giant cells were seen which did not contain any organisms. There were also many giant cells which contained partly digested organisms (Fig. 7), either irregular in form or without the usual gelatinous capsule.

The inner surface of the abscess wall was covered with débris, blood and leucocytes. External to this was a firm layer of granulation tissue containing parasites and many giant cells. Outside of this was the connective and muscular tissue of the back. The muscles were infiltrated with leucocytes which occasionally formed small miliary abscesses. In some places the granulation tissue had become quite firm so as to form a dense capsule beyond which the organisms did not penetrate.

The granulation tissue did not offer any peculiarity except for the large number of giant cells and the fact that it contained a very large number of eosinophiles and plasma cells, many more than in granulation tissue due to ordinary pyogenic cocci. The poison excreted by the blastomycetes seems to incite a productive inflammation rather than the necrosing and suppurative types seen with the staphylomycoses.

The organisms were isolated in pure culture by Dr. Hans Zinsser, and when injected into animals (guinea-pigs) reproduced the human lesions perfectly, the animals frequently showing typical nodules or abscesses with giant cells, and granulation tissue. Each giant cell usually contained one or more of the blastomycetes. The lesions were especially interesting in the spleen and lung.

The blastomycotic nodules in animals resembled roughly fresh miliary tubercles. They ranged in size from minute points to the size of pin-heads.

The lesions in the abdominal lymph-nodes of some of the animals were very extensive; the nodes were large and hard. The changes were chiefly of a productive type, a moderate amount of connective tissue surrounding large masses of blastomycetes. Microscopically the lesions in all the organs were much alike, differing only in minor details and corresponding in most essentials to those observed by other investigators.

In the spleen the lesions showed an astonishingly large number of giant cells with nuclei about the periphery. In animals which did not seem to resist the infection well there was very little giant cell formation and much more tissue necrosis than in the animals which seemed likely to survive the infection and had to be killed. In the lung in guinea-pigs killed after four or five weeks, the nodules consisted of a central area composed of parasites of varying size, some budding and some retaining their extraneous capsule. They were usually close together, and where they were very numerous, portions of the lung appeared anæmic and resembled somewhat infarcts; but microscopically these appearances seemed to be due to collapse of the alveoli. Between the parasites were thin fibrils of connective tissue, the meshes of which often contained granular detritus, resembling products of coagulation necrosis as seen in tuberculosis. Immediately about this, there were numerous young connective tissue cells and large swollen epithelial cells in the half destroyed alveoli. A moderate number of eosinophile cells were present. Giant cell formation was much less active in the lung than in other tissues, an observation previously made by Gilchrist.

The cultural characteristics of the organism were as follows: Growth was slow, small, grayish, punctate colonies appearing after forty-eight hours on glycerin agar. On agar slants they grew only to a slight depth, but very actively on the surface, forming a heaped-up yellowish creamy growth. On potato, growth was heavy and white. On litmus milk, there was growth but no change in the fluid. On gelatin, there was no liquefaction, but this was due possibly to the almost imperceptible growth at room temperature.

Unlike most of the organisms of a similar type which have been described, this form of blastomycetes grew very poorly in all fluid media, and to this may be due the absence of fermentation in dextrose, lactose, and saccharose tubes, and in dextrose, lactose, galactose, maltose, mannit, saccharose, levulose, and dextrin tubes of the Hiss serum waters.

Reproduction was by budding, and in no case even in the agar and gelatin hanging drops were mycelia observed. Observations on this point were continued for over three months on artificial media. In old cultures the daughter cells grow and bud again without detachment from the mother cells, thus forming strings of organisms. Such organisms may be seen separated from each other by a considerable distance, yet connected by a thin, straight, bridge-like line which takes the stain of the protoplasm of the cell.

In a case of Hektoen's there was apparent symbiotic relation between a pseudodiphtheria bacillus and the blastomycetes. In the pus removed from this patient there was morphologically a Gram-positive coccus which did not appear in the cultures after incubation. This apparent inhibitory effect of the blastomycetes on other organisms agrees with the experience of Gilchrist and Stokes.

The exact biological position of the parasite found in this case is still obscure. From the results of the cultures it is evident that the organism differs somewhat from those previously described in which abundant mycelium is produced. It also differs from the parasite producing the coccidioidal granuloma of the Pacific coast, cases of which have been recently collected by Brown (*Journal of the American Medical Association,* xlviii, 1907, 743). At present all that can be said is that it belongs to the group of organisms classified as blastomycetes.

The literature of the pathological aspects of the subject has been very thoroughly reviewed by Ricketts (*Journal of Medical Research,* New Ser., i, 1901, 373), Buschke (*Bibliotheca Medica,* 1902), Bassoe (*Journal of Infectious Diseases,* iii, 1906, 91), and Coley and Tracy (*Journal of Medical Research,* New Ser., xi, 1907, 237), and need not be reproduced in full here.